and contrasting head pattern of black vermiculations on a gray ground color or unicolor yellow or orange heads (males).

The new species was not obtained on any of the other Virgin Islands visited (St. Croix, St. Thomas, St. John, Tortola, Anegada, and assorted smaller islets) nor during a brief visit to Vieques and Culebra. Thus it appears that *Sphaerodactylus parthenopion* is separated from its nearest relative by the intervening majority of the Virgin Islands plus Vieques and Culebra (Virgin Gorda is among the easternmost of the Virgin Islands). It is of interest to note that the toad *Bufo lemur* Cope is known only from Puerto Rico and Virgin Gorda, though in this case differentiation to even subspecific level has apparently not taken place (Ruibal, 1959, p. 10).

S. parthenopion was collected primarily on the very rocky hillsides of the hilly portions of the island. These hillsides are covered with a low, xeric woods interspersed with cacti and thorn scrub. The geckos were not observed to "swarm" in the leaf litter as did the sympatric *S. macrolepis;* they were found only by turning rocks, and then not very commonly. *S. parthenopion* was taken once at a sea level locality (Pond Bay), but in its characteristic rocky habitat, and was not observed in the beach area among the sea-grape litter. On the lower-lying southern portion of the island where *S. macrolepis* abounded and where large series were taken in piles of rotting palm trash, the smaller species was not found. The Puerto Rican relative, *S. nicholsi,* apparently does not occupy the same or so restricted a habitat as *parthenopion,* for it can also be found abundantly in the leafy floor of coastal xeric woods or beach growth (Grant, 1931; A. Schwartz, field notes).

I wish to thank Dr. Albert Schwartz, who sponsored the field work in the Virgin Islands and the study of these geckos, and Mr. David C. Leber for his assistance in the field.

Specimens Examined

The following symbols are used to designate collections in which the type series of *Sphaerodactylus parthenopion* is housed: AMNH (American Museum of Natural History), ASFS (Albert Schwartz Field Series), KU (University of Kansas Museum of Natural History), MCZ (Museum of Comparative Zoology, Harvard).

Sphaerodactylus parthenopion: As listed for type and paratypes.

Sphaerodactylus nicholsi: Puerto Rico: ASFS X4199-205, 8 km SE Guánica; ASFS X4206-12, Playa de Caña Gorda; ASFS X4213-27, 3 mi. SW Ensenada; ASFS X4250, 3 mi. SW Ensenada; ASFS X4280-84, 9 km SE Guánica; ASFS X4286-87, 10 km SE Guánica; ASFS X4362, Laguna Cartagena, west end.

ASFS specimens of *S. townsendi* Grant, *S. gaigeae* Grant, *S. macrolepis* Gunther, and *S. m. parvus* King were casually examined in the initial search for species possibly related to *S. parthenopion*.

Literature Cited

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NEREID BLISTERS IN FLORIDA SCALLOPS

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The nereid polychaete *Ceratonereis tridentata* (Webster) has been implicated as a pest of calico scallops, *Aequipecten gibbus* (Linné), in North Carolina waters (Wells and Wells, 1962). This polychaete was found in large, dark-colored blisters which the scallop had been stimulated to secrete on the inner surfaces of its valves. In the present report, *Ceratonereis tridentata* is recorded from the calico scallop in Florida waters, and data on its incidence are presented.

Materials and Methods

Through the courtesy of Capt. J. S. Andrew and Mr. John Salvador of S. Salvador Sons Seafood Market, St. Augustine, Florida, one bushel of calico scallops was obtained from a commercial trawler for examination of the associated organisms. These scallops had been dredged January 20-25, 1964, from depths of 15-25 fathoms in the scallop beds east of Cape Canaveral (Cape Kennedy), Florida. The scallops were put on ice on board the trawler, washed in fresh water at dockside, and returned to ice for transport to the laboratory. Each scallop was shucked and examined for the presence of blisters caused by *C. tridentata*. For each blister, a careful examination was made under a stereoscopic microscope in order to locate and identify the inhabitant. The examined scallops ranged from 50-61 mm in length, with a mean of 56.2 mm.

Supplementary information on the spatial distribution of *Ceratonereis* blisters was obtained by analyzing the location of blisters in a dozen additional shell pairs. These shells, which were selected from the discarded shells accumulated outside the shucking plant, had been dredged during the preceding two months (December, 1963, and January, 1964) from the same beds off Cape Canaveral.

The Cape Canaveral scallop beds encompass an extensive offshore area extending from approximately the latitude of Ormond Beach southward to the latitude of Stuart (Bullis and Cummins, 1961). The beds are generally between 15-30 fathoms depth in this area, where the bottom is composed principally of sand and shell. Water temperatures from 19.7-28.8C and salinities from 33.5

to 36.3 o/oo have been recorded for this area (Anderson, et al., 1961a, 1961b).

Observations

Of 418 calico scallops examined, blisters that could be attributed to *Ceratonereis tridentata* were found in 14 scallops (3.3 per cent). Specimens of *C. tridentata* up to 65 mm long were removed from several blisters. In several other cases where no worm was found, the blister inhabitant had recently vacated the blisters, probably during handling and transportation prior to examination. Superficially similar blisters, which were found in six scallops (1.4 per cent) had been caused by the spionid polychaete *Polydora websteri.* In addition, most shells had small blemishes on the interior surface caused by incomplete perforations of the shell by *P. websteri.*

The localization of the *Ceratonereis* blisters contained in these scallop shells is analyzed in Table 1, with supplementary information on the position of 12 blisters recovered from the shell accumulations at the shucking plant. Most blisters were located in

TABLE 1

Location of *Ceratonereis* blisters in *Aequipecten gibbus* from off Cape Canaveral, Florida

Position	Upper valve	Lower valve	Totals	Per cent Florida	Per cent North Carolina *
Umbonal	20	4	24	92	65
Marginal	0	2	2	8	35
Anterior opening	19	5	24	92	81
Posterior opening	0	1	1	4	1
Anterior & posterior openings	1	0	1	4	18
Totals	20	6	26	100	100
Per cent	77	23	100		
N.C. (%)	75	25	100		

* North Carolina data from Wells and Wells (1962).

an umbonal position in the upper shell, i.e. occupying the concavity under the umbo, dorsal to the adductor muscle. These blisters typically possessed an opening to the exterior near the byssal notch, where the anterior wing of the scallop shell joins the anterior shell border.

Typical blisters were approximately 30 mm long by 20 mm high, ovoid to irregular in shape, and elevated 2-4 mm above the normal shell surface. Their walls were formed of a thin layer of dark brown conchiolin, which in some cases had been obscured partially by subsequent deposits of nacreous shell material. In several cases, a neat circular perforation of the blister wall provided direct access to the scallop's mantle cavity; in other cases, such an opening may have been overlooked or destroyed in shucking. Coarse detrital material contained within the blister often contributed an even darker quality to its appearance. The detrital material contained within blisters caused by *C. tridentata* is usually distinctly coarser than that which is contained within blisters caused by *P. websteri.* Frequently, a flimsy mucous-like tube 2-3 mm wide occupied much of the space within the blister. When a specimen of *C. tridentata* was located, it was contained within such a tube.

Discussion

Hartman (1945, 1951) recorded *Ceratonereis tridentata* as occurring in shelly bottoms from New Jersey to Texas, and provided adequate descriptions of the species. However, no indication of its role as a pest of pelecypods had appeared in scientific literature. Its recognition as a pest of *Aequipecten gibbus* resulted from analysis of its abundance and accompanying morphological anomalies in scallops from off the North Carolina coast (Wells and Wells, 1962). Because it can harm its host, *C. tridentata* may be regarded as a parasite of the calico scallop, although most biologists may prefer to call it a facultative commensal. In the North Carolina study, *Ceratonereis* blisters occurred in a much larger proportion of the scallop population (24 *versus* 3.3 per cent for this Florida population). On the basis of its incidence in this collection, *C. tridentata* would not be regarded as a serious pest on the east coast of Florida.

For the location of *Ceratonereis* blisters in the scallop shell, comparison with data from the North Carolina collection is pro-

vided in Table 1. There is very close agreement for the proportion of blisters in upper valves as opposed to lower valves, and good agreement on the position of exterior openings. The most significant difference in *Ceratonereis* blisters was the low incidence of marginal blisters in the Florida scallops, much lower than in the North Carolina collection. Coincidentally, the incidence of *Polydora* blisters in these Florida scallops was very low, whereas *Polydora* blisters occurred in 99 per cent of the North Carolina shells and usually occurred in a marginal position. Thus, the principal differences in the Florida and North Carolina collections were (1) the lower overall incidence of *Ceratonereis* blisters, (2) the lower proportion of marginal blisters, and (3) the much lower incidence of *Polydora* blisters.

Only circumstantial evidence is available for relating these differences to environmental factors; experimental analysis of the various relationships is lacking. The lower incidence of *Ceratonereis* blisters and *Polydora* blisters might be related to differences in size or condition of the scallops, in size, condition, or abundance of the invading polychaetes, or in physical differences in the environment. In the North Carolina study, where marginal blisters occurred in 35 per cent of the affected scallops, several scallops were found in which sand and debris had been forced between the mantle and shell in the course of dredging operations. Introduction of such foreign material under the mantle would make the scallop more susceptible to exploitation by these invasive polychaetes. Consequently, fishing pressure on the scallop population has been cited as a factor favoring or improving conditions for the production of *Ceratonereis* blisters. Moreover, the conditions produced by dredging operations would particularly favor the production of marginal blisters (as opposed to umbonal blisters) as a reaction to either polychaete species. Because the North Carolina scallop population had been exposed to considerable fishing pressure from commercial fishing trawlers during the preceding year, while the Florida population had not, much of the difference in blister incidence may be attributable to these differences in fishing pressure.

The relationship between *Ceratonereis tridentata* and the calico scallop has been described and discussed by Wells and Wells (1962). The blisters associated with *C. tridentata* are formed by the scallop's mantle in response to its irritation by this polychaete.